factors in producing diseased conditions, and, on the other, by determination of those factors through examination of diseased organs; that is to say, by the methods of experimental pathology and pathological anatomy respectively. The first of these is almost unrepresented in the volume, save by the record of work done away from Edinburgh. We venture to express a hope that, the laboratory offering as it does every facility, this neglect of constructive pathology is apparent and not real, and that it is due not to the absence of experimental inquiry, but to the fact that investigations along these lines have not become completed in the course of a short twelve months.

The facts and suggestions contained in the article upon tuberculosis, by Dr. Woodhead, above referred to, are deserving of a far wider circulation throughout the country than is rendered possible by the conditions under which they now appear. On the Continent, and, especially at this moment, in France, the infectiousness of tuberculosis, and the appalling extent of its distribution, is at length exciting that serious and general attention which precedes active measures. No disease contributes so largely to the lists of mortality. As Dr. Woodhead points out, the maximum affection by mesenteric tubercle—by tuberculosis of the lymphatic glands of the intestines—is attained between the ages of one and five years, and a large mass of evidence would seem certainly to indicate that the cause is to be sought for in the milk derived from tubercular cows.

> "Many Commissions on the subject have sat, and have delivered themselves of what must, to all who know anything about the matter, seem most sound judgments, but nothing is done. Where is our inspection of milk—not a mere chemical analysis—but a thorough chemical and biological examination? Where are our clauses for the compulsory notification of disease, either in the farm or the farm-house? Where are our regulations for the examination at regular intervals, and by competent veterinary authorities, of the cattle from which the milk is derived? . . . We must strike at the root of the whole matter as regards the connection between bovine and human tuberculosis. We then not only remove one set of centres of infection, but in so doing we, in turn, diminish the number of human centres from which the disease may spread."

Finally, a word is deserving to be said concerning the appearance of the volume. No expense has been spared in making the reports worthy of their origin. The type is large and clear, the individual contributions are well and profusely illustrated; the appearance of the volume, as a whole, is excellently calculated to make critics fulfil the motto of the College displayed ingenuously upon the back—"*Non sinit esse feros.*" J. G. A.

TREATISE ON HYDRODYNAMICS.

Treatise on Hydrodynamics. Vol. II. By A. B. Basset, M.A. (London: George Bell and Sons, 1888.)

THIS second volume of Mr. Basset's "Treatise on Hydrodynamics," the publication of which followed at no long interval that of his first volume, is in all respects a fitting complement to that work, and fulfils the expectations of value and completeness aroused by its appearance.

The prevailing impression on studying this volume and contrasting it with the first is, that many more avenues for research and discovery lie open in the subjects here treated, than can possibly be found in the more fully explored parts of hydrodynamics that constitute the subject-matter of the first volume.

This impression is borne out by the fact that many results here collected together are the results of recent years, placed in this volume in a more accessible form than when engulfed in the original papers. When we find that this book enters fully into such diverse branches of the subject as vortex motion, tides, and viscous fluids —not that these exhaust its contents—we can realize the width and variety of reading necessary to make the matter of the book as valuable and accurate as it unquestionably is, and also the probability that the author must expect to see these chapters rendered incomplete by the advance of knowledge in these directions.

The chapters on vortex motion owe their results and form largely to the writings of Prof. J. J. Thomson; in the discussion of the stability of the vortex it seems impossible to evade long and arduous algebraical processes, even though the kinematical surface condition used may be of the simplest. The author himself has given in addition an investigation of the fluted vibrations of a circular vortex ring, making use of toroidal functions, and obtaining the same equation for the periods as in the case of similar vibrations of a columnar vortex.

We have read with considerable interest a method given in the first chapter on vortex motion, in which the principle of inversion is applied for the first time to a hydrodynamical problem. It is true that its success is restricted to cases of motion in two dimensions; but a new field might be opened up if, by use of co-ordinates in an inverse system, the ordinary equations of motion would admit of yielding at once two solutions to each problem, in a way similar to the electrical method of inversion. Apparently, the co-ordinates cannot so be changed, nor is any simplification obtainable in the case of viscous fluids, where certain product terms are always disregarded.

Another most interesting chapter is that on the motion of a liquid ellipsoid under its own attraction; here the various shapes possible to rotating fluid are passed in review, and, placed as they are in order, beginning with the familiar instance of Maclaurin's spheroid, the necessary criteria that separate one possible surface from another are easily distinguished.

The question of the stability of some of these shapes is considered, and reference made to the papers of Poincaré in the *Acta Mathematica*, though certain *ex cathedrâ* statements in Thomson and Tait's "Natural Philosophy" have to go unexplained.

To enter on the discussion of waves and tides seems, by contrast with vortices, to begin a fresh subject, so totally distinct are the equations and methods; yet these two chapters are not the least valuable in the book. The chapter on waves contains all the known solutions of waves in canals or on the sea, and also includes Sir G. Stokes' masterly investigation of the form of the wave-front in the deep sea. In the chapter on tides, after a

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brief account of the equilibrium theory, Prof. Darwin's version of Laplace's dynamical solution is laid under contribution.

The last four chapters of the book are devoted to viscous fluids, and include, besides the theorems usually given, the oscillatory motion of a sphere and cylinder, published first by Stokes in 1850, and also a solution, due to the author, of the motion of a sphere under any forces. In this latter, certain integrals suggested by the theory of conduction of heat are used to obtain the equation of motion of the sphere, the solution of which can be obtained by approximation.

Certain miscellaneous theorems find a place in the last chapter, including an article on the effects of viscosity on a vortex sheet, which plainly has an important bearing on the practical determination of the stability of such a sheet.

The very full array of references to original papers adds considerably to the usefulness of this work, which is in all respects one of the most valuable on mathematical subjects that has appeared for some time. The results are accurate, the discussion of each branch is thorough and complete, and the analytical methods are powerful and in touch with the most recent developments.

THE LAND OF MANFRED.

The Land of Manfred, Prince of Tarentum, and King of Sicily: Rambles in Remote Parts of Southern Italy, with Special Reference to their Historical Associations. By Janet Ross. Illustrated by Carlo Orsi. (London: John Murray, 1889.)

THAT part of Italy lying to the south-east, forming the "heel," was once a land full of stirring events, but it has long lapsed into a state of semi-oblivion; to tell of its past glories and its present prospects is the object of this charming little volume by Mrs. Ross.

Italy seems possessed of powers of rejuvenescence, and the time appears approaching for the revival of some of the past glories of this "Land of Manfred." The traveller from Naples can now journey by rail from Naples to Taranto and Brindisi, and thence by the East Coast line north to Bari and Manfredonia; but, to get some idea of the beauty of this fair portion of Italy, one must leave the iron road and wander over flowery meads, climb up the gently sloping hills crowned with many an ancient castle and overlooking the grey olive gardens and out to the blue encircling sea; then in some measure can the land's loveliness be comprehended. This district of Apulia is not only out of the range of the ordinary tourist, but is even to this moment so little known to the inhabitants of Northern Italy that it is regarded by them as not safe to travel in; the newly-made lines of railway, the building of a great harbour for the Italian fleet at Taranto, will no doubt speedily dissipate such notions. These pages of Mrs. Ross's will undoubtedly tempt many of her compatriots to visit this fair unknown land, to its and the travellers' benefit; and they will also show that the perils of Apulia consist solely in bad inns—a peril getting less and less each season.

Many of the towns along the coast were visited by Mrs. Ross, and the leading events connected with their history are very graphically described; such as Manfredonia, Trani, Barletta, Bari, Brindisi, Otranto, and Taranto. Of the more remarkable inland places visited may be mentioned Castel del Monte, Foggia, Lucera, and Benevento.

As the chief events associated with each city or town are recorded, it is difficult to make a selection. At Bari the immense fortress-like priory attracted deserved attention; the crypt is described as formed of pillars, apparently innumerable, with their capitals richly carved in every conceivable design. Under the silver altar were the bones of St. Nicholas. The Cathedral of St. Sabinus was even more ancient than the Priory of St. Nicholas, its crypt being said to have existed in 733.

To tell of all the churches and cathedrals mentioned, and castles and fortresses described, would be but to reprint the volume, so we must content ourselves with transcribing the charming description given of Sir James Lacaita's residence at Leucaspide. The *loggia*, or arcade, running all along the south-west front of Leucaspide, overhangs a garden full of orange trees, wallflowers, stocks, Parma violets, carnations, and roses; beyond, an expanse of brilliant green corn grown under the colossal olive trees, said to be 2000 years old; then a belt of cultivated land, across which now and then the white smoke of a rushing train reminds us that we really are in the nineteenth century; and last a long line of dark pines, which fringe the Gulf of Taranto. On the opposite side of the Bay rise the Basilicata Mountains, tipped with snow, and further to the left, dimly perceptible on a clear day, are the wild and rugged hills of Calabria. The whole country is redolent of rosemary, and in the Gravina or deep ravine of Leucaspide, the myrtle, white and pink gum-cistus, the lentick and wild pears, were in a blaze of bloom. Troops of small black sheep, with eyes like topazes, graze upon thyme and other fragrant herbs among the rocks, while their shepherd dressed in a waistcoat and trousers of goat-skin, all made in one, leans against a tree or a wall, and plays wild and melancholy music on a little pipe made out of a cane.

The clever sketches by Carlo Orsi assist in illustrating a country about which Mrs. Ross tells us much, but about which it seems evident there is much more to be told, and about which we may hope to have from the same pen some still further details.

OUR BOOK SHELF.

The Zoology of the Afghan Delimitation Commission. (Trans. Linn. Soc., Zoology, Vol. V., Part III.) By J. E. T. Aitchison, M.D., C.I.E., F.R.S., &c.

ALTHOUGH this is very far from being a complete account of the fauna of North-Western Afghanistan, there is good reason to congratulate the author on his success in collecting a fairly representative series of the animals inhabiting the frontiers between Afghan and Russian territory. As Dr. Aitchison explains, his special calling is that of a botanist, and he undertook the office of collecting the fauna under considerable difficulties. The specimens obtained, representing 16 mammals, 123 birds, 35 reptiles, 2 batrachians, 7 fishes, about 100 insects, and a few *Arachnida*, *Myriopoda*, and *Crustacea*, were determined, and the new forms described, by the officers of the British

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